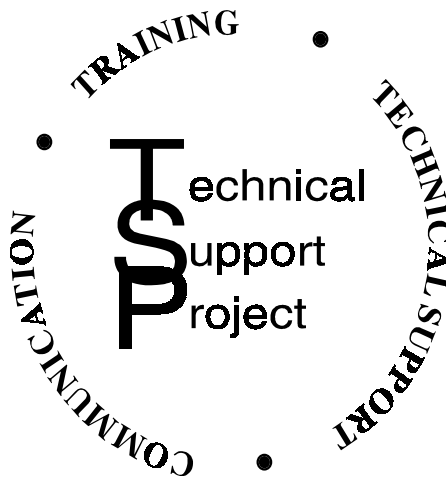


U.S. EPA TECHNICAL SUPPORT PROJECT SEMI-ANNUAL BUSINESS MEETING

**Thursday, February 13, 1997
St. Petersburg, FL**



U.S. EPA TECHNICAL SUPPORT PROJECT CO-CHAIRS

Engineering Forum:

Steve Kinser, Region 7 • Bob Stamnes, Region 10 • Frank Vavra, Region 3

Ground-Water Forum:

Ruth Izraeli, Region 2 • Herb Levine, Region 9

Federal Facilities Forum:

**Meghan Cassidy, Region 1 • Paul Leonard, Region 3
Scott Marquess, Region 7**

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FEDERAL FACILITIES FORUM BUSINESS SESSION

GEOPHYSICAL DETECTION METHODS FOR UXO, CASE STUDIES & APPLICATIONS, DR. DENNIS REIDY, GEOCENTERS

Dr. Dennis Reidy presented a description of Geocenter's Search Technologies Center, which was formed to promote commercialization of technologies developed through a joint project with the U.S. Army. The Center focuses on technology for use in surveying large areas for ordnance or hazardous waste, and countermine technology. The Surface Towed Ordnance Locator (STOLS), a specialized vehicle to tow a platform with electronic monitors, was described. The equipment is used to survey, collect data, and locate burn pits, bombs, and other utilities. The platform carries seven field magnetometers, each of which covers a three meter area. The devices work on the principle that most ordnance is made of steel and iron that develops its own magnetic field that is distinguishable from the earth's total field. Two radiometers are used to gauge the depth of objects. Location of objects is tracked by a differential application of the Global Positioning System (GPS) through radio connection with a reference site antenna.

The STOLS system has been demonstrated to be both accurate and precise, and is much more rapid than surveys conducted on foot. It produces data that is archivable and repeatable, with GIS outputs. Case studies covered in the presentation included a 60-acre site at Aberdeen, a landfill at an Air Force Base, and a New Mexico site. These included subsurface identification of containers, electrical lines and pipes, and tanks. A videotape of activities at the Pine Ridge Indian Reservation demonstrated the technology's value in locating buried ordnance. Within 2 days (working four hours a day), the system had surveyed about 60 acres, and located a burial trench. Reidy estimated that the survey would have taken a six-man team 26 days using more conventional methods. The cost per acre is less than \$500. He noted problems with tree cover and tight spacing.

Question and Answer Session

In response to a question about the equipment's ability to locate objects at depth, Reidy replied that it has located objects at seven meters. He also noted that if high explosives are expected, it is necessary to do a surface sweep ahead of time to avoid ordnance on the ground. He confirmed that the STOLS needs an operator and cannot be operated remotely. Countermining technology is generally based on infrared detectors. Reidy noted that non-ferrous ordnance (plastics or ceramic) is a problem.

INTEGRATED SITE ASSESSMENTS FOR UXO AND HAZARDOUS SUBSTANCES, HARRY CRAIG, REGION 10

Harry Craig presented a case study of integrated site assessment at the 1,700 acre Umatilla Army Depot site. The first step taken by the Army was to look at historic data to locate primary explosives (fuses, primers), secondary explosives (TNT, RDX), and propellants (white phosphorus), and chemical weapons (including mustard gas). Interim actions at the site included surface clearance of ordnance. Explosives located on the ground were either detonated in place or consolidated. Bulk high explosives and propellants are normally burned above ground. Craig noted that additional contamination may result from detonation of propellants, as they do not burn that rapidly.

The Remedial Investigation (RI) for the site included a subsurface survey, development of a GIS map that was matched with primary data, and development of a soil sampling plan for chemical contamination. Field sampling and well drilling required the presence of a UXO safety escort. The continuing RI at the site includes on-site analytical methods (colorimetric, immunoassay), and split

samples for full laboratory analysis. Ground water and surface water sampling was included at areas near to the surface or where erosion was apparent. Installation of monitoring wells required downhole geophysical monitoring to make sure nothing was in the way. The site risk assessment was based on chemical data. Craig noted that most explosives are not volatile.

The Feasibility Study at Umatilla examined a number of treatment options. UXO was cleared by burning in place or open detonation. Contaminated soil is to be screened for bulk high explosives, that will be destroyed through open burning. Treatment options for explosives residues in soil include incineration, bioremediation, and possibly phytoremediation. Options for metals and explosives in soils include incineration followed by solidification/stabilization (cost approximately \$500 per ton) or solidification/stabilization alone (\$170 per ton). The latter option was considered acceptable for low to moderate concentrations. Ground-water treatment options for explosives in ground water considered were ultraviolet oxidation, pump and treat with granular activated carbon (GAC), or phytoremediation. Metals were to be treated by precipitation. Craig noted that ultraviolet oxidation presented some problems because of breakdown components, and that phytoremediation (considered for TNT but not RDX) is very slow. He reported that the treatment of choice for chemical UXO is incineration at a permitted facility. Although eight such facilities are scheduled to be opened in the country, they remain controversial.

Remedial Action (RA) at the site has moved forward based on Region 10's position that all primary explosives, bulk high explosives, and secondary explosives at concentrations greater than 10% are considered reactive under RCRA. Treated wastes must be non-reactive and meet CERCLA risk-based cleanup levels. UXO clearance will be conducted to a depth appropriate for future land use proposals (generally 2 to 10 feet). DoD has developed guidelines that may be implemented in the future. He also noted that UXO metal scrap must be certified non-contaminated before recycling. Institutional controls or deed restrictions may also be implemented (*e.g.*, for digging or building on the site).

Question and Answer Session

Craig was asked whether “transfer to lease” for land use control was being considered. He said this has not come up yet. He also noted that EPA may not have the authority to enforce this option at DoD cleanups. A Forum member from Region 5 noted that they had accepted some deed restrictions, but not all, when the land was transferred to a county park. Liability is an issue; however, DoD generally wishes to transfer liability to the lessee. It was noted that compliance also was a problem in that the Army does not want to retain enforcement authority. Someone asked how scrap metal was tested before being recycled. Craig responded that this is generally a liquid test on a sample of materials. About 300,000 pounds of scrap metal has been recycled at Umatilla.

RISK ASSESSMENTS FOR UXO (POLICY, EXAMPLES, FUTURE ACTIVITY), DOUGLAS A. BELL, FEDERAL FACILITIES RESTORATION AND REUSE OFFICE

Doug Bell, of OSWER's Federal Facilities Restoration and Reuse Office (FFRRO), has been working in negotiations with DoD on the Range Rule for the past 14 months. EPA and DoD agreed that the Range Rule portion of the RCRA Military Munitions Rule would be the responsibility of DoD. Although the Military Munitions Rule was signed on February 3, language on military ranges was deferred. DoD's proposed Range Rule was recently withdrawn from OMB review due to concerns from both stakeholders and regulators. EPA comments on the DoD Range Rule Risk Assessment proposal were released on January 9, 1997, under Tim Field's signature. It is possible that DoD did not think they could accept EPA comments, and other federal regulator changes. In the event the DoD Rule does not go forward, EPA is prepared to handle the range issues under the Military Munitions Rule.

DoD's proposed Range Rule Process begins with an identification of the range and a qualitative analysis to determine whether a detailed assessment is required. Bell reported that most military ranges have not been designated as areas of concern, and therefore, DoD has not done very much site characterization to date. The qualitative analysis under consideration by DoD is based on a desk top review of previous records, but as many of us have experienced, DoD often has no records, and it is unclear what alternative DoD proposes in the event records are not available. In addition, EPA has pushed DoD to release their range assessment prior to conducting an accelerated response, a provision not considered in DoD's proposed process. EPA also is pushing for DoD to conduct a detailed risk evaluation after the qualitative evaluation if the circumstances warrant a more detailed study. An additional concern is that USDA and DOI, which would presumably receive the land, do not want to assume liability if the property is transferred to them.

Question and Answer Session

The Federal Facility Forum asked why a new process is being developed, when RCRA and CERCLA already are in place to deal with this issue. Bell responded that the military did not want to conduct cleanups under RCRA, but wanted to develop their own standards.

Additional outstanding issues for DoD include the release of information to stakeholders, and the time that may be required to bring communities into the process. Also DoD's definition of an Interim Response is different from EPA's. Under DoD rules, an Interim Response could be a fence and placard, followed directly by range closeout. Formerly-owned defense sites (FUDS), BRAC facilities, and NPL sites all frequently include military ranges.

UXO risk assessment needs to be separate from hazardous chemical risk assessment to ensure that they both are given adequate attention. If UXO is identified, the DoD risk model applies. It focuses on the probability that individuals will come into contact with UXO. Generally, DoD may default to explosives safety and indicate that the risk is so high that cleanup is too dangerous. However, these properties are still likely to be turned over to DOI or USDA. At present the risk model does not consider proximity (*e.g.*, a trespasser coming in close proximity to UXO), but only probability of detonation. They also do not consider degradation of materials in the risk model.

Another Forum member asked whether ecological risk was considered. Bell responded that ecological concerns are not explicitly addressed. The first concern is explosive safety risk to responders. Ecological risk could be considered during the second phase, or during either the streamlined risk evaluation or detailed risk evaluation, but generally, it is unlikely that ecological risks would outweigh the explosives risk under the current DoD model.

Stan Zawistowski asked whether the Range Rule addresses biological warfare agents. He has been working with the State of Utah on these issues. One problem he identified is access to classified information. There are so few individuals who know what is going on, that it is not likely to ever be included in the risk assessment. Doug Bell reported that the rule does not specifically address these issues. DoD is attempting to remove chemical and biological warfare agents from the general process. DoD will resubmit the rule to OMB in late March or early April. He suggested Zawistowski submit comments on this through his Regional Office.

Bell distributed a chart of the Range Rule Risk Assessment process and asked Forum members to forward comments to him. Harry Craig noted that there are currently a number of national work groups addressing the Range Rule, Munitions Rule, and BRAC. He suggested a national conference to help resolve overlapping issues. The Forum Co-chairs, Doug Bell, and Harry Craig will continue discussions regarding the possibility of a national work group on military munitions. DoD recently

held a Keystone scoping meeting on military munitions. Meanwhile, EPA and other Federal agencies continue to voice their concerns.

JOINT FEDERAL FACILITIES FORUM AND GROUND WATER FORUM BUSINESS SESSION

NATURAL ATTENUATION OF CHLORINATED SOLVENTS, HERB LEVINE, REGION 9

Herb Levine led a panel discussion on technical and policy issues related to natural attenuation (NA). He reminded Forum members that comments on the OSWER Directive issued in draft on January 3 from Tim Field's office are due on February 21. Some of the Ground Water Forum members noted that this due date for comments could be a problem, as they had received the document rather late. Herb pointed out that the directive refers to two protocols:

- The Ground Water Forum has commented on the protocol for natural attenuation of chlorinated solvents developed by the Air Force Center for Environmental Excellence (AFCEE). Curt Black will provide an update.
- A previous protocol on natural attenuation or intrinsic bioremediation of petroleum products.

OSWER Directive on Natural Attenuation

Ruth Izraeli is on the OSWER work group that developed the policy directive. The group is made up mostly of Headquarters and Regional representatives from the Underground Storage Tanks, CERCLA Federal Facilities and RCRA programs. She reported that the draft directive was issued on January 30 for review by the Regions. It has not yet been distributed to states or PRPs for comment.

Izraeli provided highlights of the policy directive. It defines natural attenuation as all physical, chemical, and biological processes that reduce contamination in ground water and soil. Physical processes include dilution and dispersion; examples of chemical processes are hydrolysis and radioactive decay; and examples of biological processes are reductive dehalogenation, and aerobic biodegradation. The directive applies to Superfund, RCRA Corrective Action and UST sites. The document discusses a few classes of compounds (*e.g.*, BTEX, chlorinated solvents, and PAHs in surface soils) and whether they are amenable to NA. The key issue is whether the processes are occurring quickly enough and completely enough to achieve remedial objectives. For example, it is estimated that only 5 to 20% of chlorinated solvent sites may be remediated using NA.

The role of natural attenuation in OSWER remediation also is defined. NA is used in a similar fashion or in the same way as other treatment technologies. It is generally used as part of a treatment train. NA is not a remedy itself, but can be combined with pump-and-treat, source removal, and other technologies. In CERCLA, NA must be considered as other technologies are in the framework of the nine decision criteria. It also must meet a "reasonable timeframe" criteria. NA is not a presumptive or default technology at any site.

The effectiveness of NA at any site must be demonstrated using site-specific characterization data. A well-defined conceptual model that defines the sources, pathway, seasonal changes, and processes affecting transport assumed to occur is critical. The types of information required to demonstrate NA include:

- historical ground-water quality data (NA can be selected only on this basis if the characterization is complete and site data indicate that contamination will be reduced in a reasonable amount of time)
- hydrogeological and geochemical data (approximately ten geochemical parameters are suggested)
- microcosm studies of geochemical processes to demonstrate natural processes.

Generally, at least two levels of data will be needed. Forum members cautioned that NA should not be selected on the basis of the first level of data alone. Dick Willey noted that the use of historical water quality data assumes that the monitoring wells are in the proper location. Available data may not give a good picture of what is going on at most highly contaminated sites. In response to another question, Izraeli noted that field measurements need to meet acceptable QA/QC standards (although not necessarily data levels 3 or 4). Also, it may be necessary to select an alternative or contingency remedy. Finally, the directive emphasizes the importance of performance monitoring.

Discussion Session

Harry Craig commented that if you decide on NA and simply let it go, things could become much worse rather than better. Izraeli noted that one of the criteria is that the plume must be stable. Craig also asked about the effects of sorption. This could lead to delayed releases in the aquifer. Izraeli noted that this happens with pump-and-treat as well and is accounted for in the directive. Members noted that the only way to reach cleanup levels using NA is to remove or contain the source. If you have data showing trends for reduction over a considerable time, you still have to be able to account for what is going on. Carol Witt-Smith asked how this model will work with RCRA. Under RCRA, if contaminant concentrations exceed action levels at the point of compliance, it is necessary to add engineering controls. Izraeli responded that the directive is consistent with that, but at Superfund and UST sites, you don't necessarily have this control. Someone else asked whether the policy addresses breakdown products, and was told that it does.

With respect to Forum comments, Izraeli noted that EPA's technical guidance is not yet available. The Ground Water Forum has recommended that the technical guidance and directive be issued simultaneously. She asked whether the Ground Water and Federal Facility Forums would like to issue joint comments on the draft directive. After discussion, it was decided that the two Forums would respond separately. Ground Water Forum comments are due to Ruth Izraeli by February 19. Federal Facility Forum comments will be compiled by Debbie Tremblay.

Action Items

- Ground Water Forum members will forward comments on the draft OSWER Directive on Natural Attenuation to Ruth Izraeli by February 19, 1997.
- Federal Facilities Forum members will coordinate their comments through Debby Tremblay (FFRRO).

ORD Technical Guidance/Workshops

Jerry Jones, of the NRMRL Ada laboratory, noted that ORD's scientists had worked closely with the Ground Water Forum for many years. But he pointed out that ORD has no authority to issue policy,

and in general, stays out of policy issues. He said that the program representatives would have to determine whether their technical positions are well documented enough for policy.

According to Jones, NA is probably the only tool for remediation that will occur whether or not EPA recognizes it. Technical issues associated with NA are very site specific. Used in conjunction with some of the other tools we have available, it can work very well. Jones noted that there are currently two AFCEE protocols related to NA: 1) an earlier protocol for petroleum hydrocarbons, and 2) a more recent protocol for chlorinated solvents. Both protocols were developed by large groups, and therefore they include a number of view points.

The Ada lab is developing a document that will incorporate technical issues related to both these protocols. The focus will be on technical issues only. The objective is to help RPMs determine whether NA is occurring, whether it is a potential tool for this site, and whether additional technical assistance is needed.

The lab is also developing an NA workshop which will be first presented in Region 10 in May. The number of participants will be limited to ensure full participation and because similar workshops will be conducted in the other Regions. They hope to have the draft guidance document ready for review by the Forums in April, so it will be complete before the May workshop. He asked the Forums to comment on draft fact sheets for both petroleum and chlorinated solvents. In response to a question, Jones noted that the document will undergo an ORD category two peer review. This will include an external peer review, and review by as many technical experts within EPA as possible.

AFCEE Protocol on Chlorinated Solvents

Curt Black provided the Forums with an update on the development of the draft AFCEE Protocol on Chlorinated Solvents. He emphasized, that while it is a good technology transfer document for those who want to apply natural attenuation, it is not an EPA document, or one that the Agency should endorse. Three major issues with EPA acceptance of the protocol are: 1) it does not develop the state of the science adequately; 2) the language used is inconsistent with EPA's approach; and 3) the analytical tools are not addressed. The document includes a disclaimer stating EPA concerns, but Black believes this should be made more obvious.

The regulatory framework for NA is not made clear in the document. In addition, it fails to address potential depletion of fuel hydrocarbons. There is inadequate emphasis on source control and treatment. It is also internally inconsistent since implementation of some of the source control measures suggested could change the geochemistry and impair NA processes.

An additional problem with the protocol is its failure to consider ground water as a resource. It focuses on human receptors down gradient of contamination, but ignores the potential for beneficial uses of ground water. Finally Black pointed out that NA is not evaluated against other potential remedies.

Discussion

Craig Thomas pointed out that the Air Force position currently is that it is necessary to show that NA will not work in order to justify selection of another remedy. Other Forum members noted that DOE may be planning to use the protocol as well. Although there was agreement that the upcoming EPA guidance and policy statement should supersede this protocol, there was disagreement as to how this can be accomplished. Jerry Jones said that he would provide copies of the document to any Forum members who would like one.

Harry Craig asked if anyone had experience at a site where NA or intrinsic remediation has worked for chlorinated solvents. Herb Levine said that there are two Navy sites in Region 9 where NA is being evaluated as a remedy. He said the Region also had reviewed other applications of the AFCEE protocol. In some instances it was accepted, but not all. Harry Craig noted that Region 10 has a DOE facility with a one-and-a-half mile TCE plume in fractured rock. DOE was unable to demonstrate intrinsic remediation within a six month period. Kathy Davies noted that up to 26% of RODs have some form of NA, where as only 2% have technical impracticability waivers. She pointed out that NA could be used as a way of avoiding demonstrating technical impracticability.

Kay Wischkaemper reported that she has used an abbreviated version of the AFCEE protocol to develop a Region 4 guideline. She suggested that this could be incorporated into the EPA policy. Someone else noted that the States have not yet had an opportunity to review it. Curt Black noted that an inherent problem with the approach taken by the document is the attempt to demonstrate that NA is taking place, rather than looking to see what processes are going on and determining whether NA is one of them. The group agreed that the protocol is important because there is a vacuum of information and it is currently the only thing out there. EPA could counter this by developing its own protocol (which it is). A final issue is EPA's participation in developing the AFCEE protocol. John Wilson, of the Ada Laboratory, was involved as a technical expert in its development. Forum members felt the Air Force should make clear that his contribution was a personal opinion, not an EPA position or EPA acceptance of the Air Force's position.

APPLICATION OF NATURAL ATTENUATION AT CRANE NWSC, CAROL WITT-SMITH, REGION 5

Carol Witt-Smith presented a case study of natural attenuation at the Crane ammunition burning ground in Indiana. This site is being addressed through the RCRA program. The site has been used for destruction of explosives, solvents, red phosphorus, flares, and other contaminants since 1940. Formerly, materials were burned directly on the ground. The site is located in a ridge and valley formation in sandstone and limestone. There are multiple aquifers, a creek and springs in the area. Currently there are 72 monitoring wells maintained by the state and EPA. The geology is such that a natural funnel and gate system channels both ground water and surface water flow to the lower end of the valley. Surface water runoff is the biggest issue, including sediments and overflow. The entire area is contaminated with explosives and metals. A former waste pile has been removed, and contaminated surface installments are being removed. The facility is seeking a permit for future activity.

The contaminated ground-water plume seems to be contained within the valley. Tracer tests have shown that ground-water flow is extremely slow, eliminating pump-and-treat as a remedy. Source control is being addressed through composting of 20,000 cubic yards of soil. Hot spots with significant TCE, TNT, and RDX contamination have been identified.

Natural attenuation has been determined to be the only potential remedy for explosives in ground water. Monitoring well data will be used to demonstrate that natural attenuation is occurring. A number of studies are being conducted by USACE involving the use of biomarkers, the potential for immobilization of TNT in soils, and microbial degradation of TNT and RDX. Surface water from springs and runoff to the stream also will be treated.

Natural attenuation will be monitored through evidence of declining concentrations over time and limited contaminant migration off site, among other measures. This is a Navy-owned, Army-operated facility. They are already seeing that contaminant levels are being reduced as various source areas are cleaned up. They expect to continue to operate the facility for the next 30 years.

Question and Answer Session

Someone suggested a reactive wall taking advantage of the natural funnel and gate formation. Carol noted that this has been considered, but that it would be difficult to install. Because of the slow ground-water flow, she is not sure it would be needed once the soil is cleaned. Barium and aluminum are also of concern at the site. Dioxin releases to the air may be an issue for continued burning at the site and will require monitoring.

DISCUSSION OF FEDERAL FACILITIES FORUM ISSUES AND POSITION ON NATURAL ATTENUATION, FORUM CO-CHAIRS

The Forum Co-Chairs led a discussion on the Federal Facilities Forum's issues and problems with NA. Forum members raised a number of issues related to the use of natural attenuation as a remedy for contaminated ground water at Federal facilities, including:

- In situations where ground-water flow is minimal, as in the previous case study, it is not possible to demonstrate natural attenuation.
- Desorption is not being addressed in NA remedies.
- NA includes dilution as well as degradation. The very broad term “reduction in concentration” is generally given too much weight. There is not necessarily a mass reduction.
- The “reasonable time” criteria depends almost entirely on future land use.

Glenn Kistner explained that Region 9 formed a work group to address NA two years ago. Some of their work is captured in the OSWER directive. He offered to send a copy of their report to Forum members. Bill Roach noted that he has a report on a case study of NA for a TCE plume, which he also offered to forward to the group. Carl Froede of Region 4 expressed his opinion that the Air Force is frequently proceeding without EPA concurrence or even informing EPA of their activities. He used the case of a surfactant study in Mississippi as an example. He was the RPM at the time, and found out about their activities through a presentation at a conference he attended. He believes the Air Force intends to move forward with or without EPA concurrence. Other Forum members raised additional problems in implementation, application, and policy differences with other Federal agencies in this area.

Paul Leonard asked that everyone forward specific issues to him so that they could be discussed in a follow up teleconference on this topic. The Ground Water Forum also will be invited to attend. February 26 was selected as the date the teleconference will be scheduled.

Action Items

- Glenn Kistner will distribute copies of the Region 9 work group report to Forum members for their information.
- Forum members will forward a list of issues to be discussed at the February 26 Forum teleconference on NA to Paul Leonard.

LOWERY PERMEABLE WALL CASE STUDY, RICH MUZA, REGION 8

Rich Muza presented a case study of a reactive wall demonstration project at Lowery AFB near Denver, CO. The demonstration was conducted jointly by the AFCEE, EPA, and the Colorado Department of Public Health and Environment. The purpose was to demonstrate the applicability of an iron filings reactive wall for ground-water remediation. Potential advantages of the treatment were that contaminants would be destroyed (not moved from one media to another), the system is passive and *in situ*, the life span of the permeable wall was expected to be a number of decades, and the most common contaminants at the site would be effectively treated.

The site geology consists of a thin alluvial system over clay, from one to 60 feet deep. Ground water is found at 4 to 15 feet below the surface, and there are paleo channels that affect ground-water flow. The contaminants of concern include TCE, PCE, and vinyl chloride. Site characterization work began with hydropunch and cone penetrometers to gather both shallow and deep samples. An on-site laboratory assisted in characterizing a contaminant plume about 1,500 feet wide that extends for about two miles. The Air Force is considering a ground-water containment system at the boundary of the base.

The project team performed detailed subsurface characterization to determine the location of the permeable wall, and used modeling to determine the best thickness. Ground water in the selected region was shallow, and flow was considered adequate. The halogenated organic contaminant concentrations found at the site were considered representative of other Air Force Bases. At the location the wall was to be installed, the depth to ground water was 10 feet and depth to bedrock 17-18 feet. Ground-water sampling and analysis indicated good hydraulic conductivity of 35 feet per day.

Column tests were used to develop an estimate of the amount of time ground water needed to reside within the wall (residence time) to effectively treat contaminants. One to three days residence time was determined to be needed and that determined the thickness of the wall. A funnel and gate configuration was selected, utilizing a ten foot wide by six foot thick wall with funnels angled at 45 degrees. Two feet of pea gravel was installed on either side of the reactive wall. Bentonite was used to seal the bottom and top of the wall to prevent flow over or under the wall. Wells were installed throughout the wall to allow performance monitoring. The findings indicated some mounding of flow in front of the wall. Within the wall, oxidation reduction potential dropped significantly, pH rose, most chlorinated compounds degraded (to below detection limits down gradient), and degradation was consistent across the wall despite varying concentrations coming in. In addition, porosity losses in the reactive material were only about 13-14% during the first year.

A cost comparison indicated that costs over 30 years would be less than pump-and-treat or air sparging. Recommendations from the demonstration included use of an *in situ* velocity meter, reduced monitoring requirements over time, and the use of lower cost installation procedures (*e.g.*, a trench system rather than the relatively expensive Waterloo interlock used for the demonstration).

Question and Answer Session

Rich Steimle noted that because this was a demonstration project, a great deal of characterization and performance data was collected. He asked whether the system was good enough to move forward at other sites without conducting pilot tests. Muza said that he believes that enough is known about the technology to do without full-scale pilots as long as the site characterization data is adequate to design the system. Column tests in this case helped to predict clogging rates and determine residence time.

ISSUE PAPERS, CO-CHAIRS

Paul Leonard, Scott Marquess, and Meghan Cassidy led a discussion of three proposed Federal Facilities Forum issue papers. Two were proposed by Carol Witt-Smith and Craig Thomas of Region 5, and provided to Ken Brown of the Las Vegas Laboratory for review:

- *Fate and Transport of Explosives in Ground Water at Federal Facilities.* Project managers for both RCRA and CERCLA sites have identified the need for understanding how explosive contaminants react, degrade, and transport through the ground-water system. The issue paper would include a discussion of the chemistry of explosives found in ground-water plumes; an explanation of how explosives degrade in the aquifer; an explanation of how soil type affects degradation and transportation; what physical processes control the transport of explosives in the aqueous phase, how ignition materials or solvents may affect the characteristics of the plume, and emerging research and literature review.
- *Fate and Transport of Explosives in Soil at Federal Facilities.* This issue paper would address similar topics related to explosives in the unsaturated zone. It would address open burning and open detonation areas, and UXO. The purpose would be to provide an explanation of how explosives are disposed of and act in the soil to provide insight on delineation and treatment of soil contamination.

Forum members suggested the two issue papers also address mixed wastes, risk assessment, and case studies. Paul Leonard suggested that the issue paper outlines be distributed to the Forum for comments, and they be discussed at the next teleconference call. Carol Witt-Smith also suggested that the Army's Waterways Research Station be invited to participate.

Harry Craig proposed a third topic for an issue paper: *Field Sampling and Selecting On-Site Analytical Methods for Explosives in Water.* The paper would address on-site analytical methods that currently exist for TNT, TNB, RDX, HMX and Picric Acid. Colorimetric, immunoassay, and biosensor analytical procedures provide real time data, are lower in cost than laboratory HPLC methods, and may be valuable tools for ground water, surface water, and treatment plant process monitoring. The paper would be similar to the current Federal Facilities Forum issue paper regarding field analytical methods for explosives in soils. Topics to be included cover: explosives compounds of interest; Office of Drinking Water Health Advisory Levels; holding time study for explosives in ground water and surface water; water methods available; detection limits; interference/cross reactivity with secondary target analytes; SW-846 methods; accuracy comparisons of on-site methods with Method 8330; treatment technologies; and advantages, disadvantages, cost, ease of use of various methods. Craig offered to distribute copies of an outline for future Forum consideration.

Action Items

- Co-Chairs will distribute issue paper abstracts to the Forum for comment.

FEDERAL FACILITY BUDGET ISSUES, MEGHAN CASSIDY, REGION 1

Meghan Cassidy led a discussion of budgeting for Federal facility cleanups. She noted that BRAC funding is ending, and cleanup costs will be folded into general Federal facility budgets, and that OMB has told the services to expect level funding over the next five years. As a consequence, Cassidy recommended that EPA Federal facility project managers learn more about: the budget building process (including requests made by the facility); prioritization of funding across regions and states; and allocation of funds received. If the facility does not receive all they have requested, EPA needs to

be involved in their internal decisions regarding cleanup. Because of the nature of the military budgeting process, EPA needs to be involved at both the headquarters and regional levels.

Cassidy noted that a work group composed of headquarters enforcement staff and regional staff is working to incorporate budget issues in Federal Facility Agreements (FFAs). Regions 9 and 10 have had some success in dealing with this issue at the upper management level. The issue is critical for Federal facility cleanup because the military has taken the position that they will not include in an agreement anything they do not anticipate fitting within their projected budget. EPA's position has been that EPA should negotiate a comprehensive agreement. The principle of force majeure allowed that EPA could not hold them to anything not funded. However, the services have said this is not adequate.

The language they are proposing mimics last year's Keystone report. It allows for rolling milestones, and an annual revisitation of the schedule. Federal facilities cannot be penalized if Congress doesn't give them the funds, and their appropriations are made annually.

Another problem is that the services say that EPA is already participating in the budget process. Cassidy distributed a survey with questions regarding the extent to which Forum members are included in budget decisions. She hopes to gather evidence of problems so EPA headquarters can document their position. But she noted that EPA project managers will also have to be willing to learn their process and become involved as individuals.

The enforcement work group is developing language to be inserted in FFAs with the Navy that will give EPA more leverage. For Superfund cleanups, EPA has no statutory authority to force the services to do something not funded by Congress, however primary deliverables within the FFA can be enforced. For example, the Savannah River DOE site was fined \$3.5 million.

Discussion

Craig Thomas noted that Region 5 has a number of BRAC sites that do not have FFAs, and wondered if there was any way to address budgeting with no FFA in place. Cassidy noted that negotiations will likely have to be completed separately for the Army, but thought the Navy document would provide a good starting point. She noted that Region 1 has had some success in becoming involved in the budget process. Installations can provide EPA project managers with A-106 documents that show what they are asking for. Floyd Nichols noted that in Region 8, the BRAC program had indicated no further need for regulatory involvement after the Remedial Action has been approved.

Cassidy suggested Forum members begin with Chapter 5 of the Keystone Report developed by FFERDC. Everyone should become familiar with the process outlined there. She also asked that Forum members return their survey questionnaires to her within two weeks.

Action Item

- Forum members will return completed survey forms to Meghan Cassidy within two weeks.

HEADQUARTERS UPDATE, DOUG BELL, FFRRO

BRAC Success Stories

Doug Bell asked Forum members to participate in a project to collect information on BRAC successes. The purpose is to help spread the word about how to make Federal facility cleanups faster, more

effective and less costly. Debby Tremblay will use the information to create a series of 4-page success stories that demonstrate the positive effects EPA has had in quick cleanups. The audience will be communities, media, Federal, state and local regulators, RABs, and congressional staff. The first set of 13 success stories is due to be completed in May. Themes to be highlighted in the fact sheets include: use of innovative technologies for site characterization and remediation; streamlined oversight due to interagency agreements; variable oversight approach; community participation in the decision-making process for setting cleanup levels; determining future land use; and choosing cleanup technologies. The point is that these agency initiatives have resulted in time and cost savings for communities and taxpayers. Sites to be profiled are the Army Materials Technologies Lab, Plattsburg AFB, Cameron Station, and the Naval Training Center in Florida, among others.

DoD Draft Range Rule

Bell reviewed the status of the DoD Draft Range Rule. DoD and OMB have agreed to withdraw the current draft from review, presumably so additional changes can be made. Most EPA issues have been tentatively resolved—EPA has had a lot of success in negotiations. However, changes have not yet been confirmed in a revised version. DoD also has heard a great deal of comments from USDA and DOI. DoD is reevaluating their position with respect to regulatory involvement. DoD plans to resubmit the draft to OMB in late March or early April. In the interim, EPA has finalized the Munitions Rule. Bell also noted that FFRRO really appreciated input from the Federal Facilities Forum.

Scott Marquess asked if the Munitions Rule would not provide a better position for EPA, suggesting EPA withdraw from involvement in DoD's Range Rule efforts. Bell explained that the process is moving forward in accordance with previous high level agreements made between OMB, DoD, and EPA. He also felt it was of value to EPA to remain informed about their approach, and to determine in advance how difficult issues will be dealt with. Bell suggested that the last thing EPA wants is a Range Rule that doesn't work. If DoD continues to delay, they will eventually be in court and they will have to prove that the Range Rule is more protective than the Munitions Rule and/or other regulatory authorities already in place (e.g., CERCLA or RCRA).

DoD Range Rule Risk Assessment

Bell also summarized the status of the DoD Range Rule Risk Assessment effort. He noted that EPA comments were submitted to DoD on January 9, 1997. DoD plans to respond to comments within 60 days, and a meeting will be scheduled in March. Forum members discussed existing EPA efforts at risk assessment on military ranges. Both Ft. Meade and the Ordnance Cost Effectiveness Model developed at Huntsville are examples of risk assessment. At West Virginia Ordnance and Anniston among others, EPA has applied Superfund's risk assessment guidance. In Region 10, at Umatilla, EPA used the 10% reactivity RCRA rule as justification for cleanup.

Bell noted that EPA has provided significant risk assessment support to DoD on the Range Rule effort. As part of this effort, EPA and DoD developed “decision logic” to define explosives, including UXO and “other constituents” (e.g., EPA’s hazardous chemicals). Regardless of whether the Range Rule effort moves forward or not, this aspect of our work is very important since a method for addressing both significant problem issues at military ranges has been defined. At some point in time, UXO and “other constituents” will need to be addressed in some type of detailed manner under one explicit or several regulatory authorities. In this manner, the regulators are making progress. However, the current DoD approach only addresses the “explosives safety” issue and risks to responders, based upon decisions rendered at DDESB, would ultimately outweigh risks from environmental threats. Explosives are the only issue of concern. Someone commented that EPA has used the probabilistic risk

assessment approach being proposed by DoD at the Aberdeen site. It was noted that characteristic hazardous wastes that exceed ARARs obviate the need for completing a risk assessment. But it is necessary to demonstrate a risk to trigger action.

Air Combat Command Rational National Standards Initiative (RNSI)

Doug Bell summarized this DoD initiative by saying that final comments from EPA's regional offices have been received. EPA's consensus is that the initiative adds little to current approaches. Comments will be submitted to the Air Combat Command (ACC) in March. He further noted that ACC has developed six scenarios for land use that are used to develop screening levels. This allows them to avoid using the standard residential scenario favored by EPA. They have tried to retrofit EPA's process at 18 locations in 17 states. Paul Leonard noted that at one site in Region 3, EPA followed its own risk screening process. When the ACC came to EPA, we were able to inform them that EPA already had done this and our way is better. Bell confirmed that EPA does not concur with RNSI.

Lead Directive

Bell noted that EPA's Office of General Counsel (OGC) has determined that releases of lead chips can be addressed under CERCLA, suggesting that lead based paint may fall under Superfund authority. This may have a significant effect at military bases where left over lead paint for aircraft, water tanks, and railroad cars has been used on buildings. It is still too early to know what the consequences will be. Finally, in response to a question, Bell said that he would attempt to find out about the status of an ongoing Inspector General (IG) audit of Federal facility data and report back to the Forum.

The planned discussion of the site inventory database being developed by the Forum and future activities was deferred until the next regularly scheduled conference call.

Action Items

- Doug Bell encouraged Forum members to forward their comments on the DoD Range Rule Risk Assessment process through their Regional management if they have not already done so.
- Doug Bell will report on the status of the IG audit on Federal facility data at the next teleconference.
- The site inventory database and other future activities will be discussed at the next teleconference call.

GROUND WATER FORUM BUSINESS SESSION

DISCHARGE OF GROUND-WATER CONTAMINANT PLUMES TO STREAMS, BREWSTER CONANT, UNIVERSITY OF WATERLOO

Brewster Conant, of the University of Waterloo, presented an overview of the current state of knowledge regarding discharge of solvent plumes to streams. He also identified and discussed the factors that will affect the near stream flow path of a discharging plume. Included in the presentation was a discussion on the importance and complexity of the near stream ground-water/surface water flow system and a scientific basis for further discussion regarding this subject, as well as a starting point for developing new actions, policies, or regulations to protect the GW/SW interface. A copy of Conant's presentation materials and an abstract of his presentation will be sent to all Forum members.

Since much of Conant's work has not yet been published, he would like for all Forum members to not distribute his presentation materials without his permission.

Question and Answer Session

In response to a question, Conant said that passive collectors may help identify where discharge zones are in a system and that bioindicators and bioaccumulation can help identify certain loadings. Dick Willey, Region 1, noted that there are a number of semi-permeable samplers available. Kathy Davies, Region 3, noted that passive samplers often provide false results with media that contains naturally occurring inorganics.

GROUND-WATER/SURFACE WATER INTERACTION SUBCOMMITTEE, DICK WILLEY, REGION 1

Dick Willey presented the Forum with an update on the work being conducted by the Ground-Water/Surface Water (GW/SW) Interaction Subcommittee. Willey noted that the Subcommittee has decided to focus on technical issues and to not pursue any program or policy issues surrounding GW/SW interactions at this time. The Subcommittee is in the process of developing a draft agenda for a technical workshop. In addition, the Subcommittee is discussing the possibility of developing technical guidance on GW/SW interactions, a Statement of Purpose (SOP) for GW/SW interactions, and guidance on further research needed in this area.

Willey noted that the Subcommittee has been approached by the Ground Water Protection Council (GWPC) of the National Ground Water Association about the possibility of holding a joint workshop. The GWPC may soon be awarded \$15,000 to conduct a conference on this issue, but plans to focus the conference on the whole watershed. Willey said that he is reluctant to have the Ground Water Forum co-sponsor this conference because of the broad focus of the meeting, but that individual members could attend and report back to the Forum on their findings at a future TSP meeting or teleconference call.

Next, Willey identified the key issues important to GW/SW interaction study: site characterization, problem identification, and monitoring. He said that to focus on the kinds of measurements that need to be taken to understand these interactions, there needs to be a better understanding of the perspective ecologists have on GW/SW interactions.

Willey said that the Subcommittee intends to ask ecologists from each Region to help answer some of the GW/SW interface questions. However, the level of interaction with these ecologists remains to be determined. René Fuentes, Region 10, noted that the mutual education of both groups is more important than involving a specific ecological member on the Subcommittee.

The next GW/SW Interface Subcommittee call will be on February 27, 1997. The call-in number is 202-260-7280, conf. code 5391#.

SOIL SAMPLING FOR VOCs: DISCUSSION ON TECHNIQUES AND REGIONAL PROTOCOLS, ANDY BELIVEAU, REGION 1

Andy Beliveau, a Quality Assurance Chemist with EPA Region 1, gave a presentation on minimizing volatile losses during collection, handling, and preservation of soil samples for VOC analysis. Beliveau stated that present methods of sample collection, handling, and analysis do not prevent volatile losses or preserve the soil sample adequately. Soil volatile losses, observed by some researchers at up to two orders of magnitude, are very high compared to water sample volatile losses. EPA Region 1 is drafting

methods for minimizing volatile losses that will be sent to all other Regions for review to reach a consensus on recommended methods.

Beliveau outlined the basic elements of preservation, defined as preventing loss of volatiles from the point of exposing the soil to the time of sample analysis. The following steps will help prevent volatile loss:

- Collection: sample should be collected quickly with little or no exposure to air. (Region 1 uses a 10mm syringe as a coring device)
- Containment: sample should be placed in an air- and liquid-tight container.
- Medium: sample should be placed in a medium that does not allow loss of VOCs to air, or by bio-, photo- or chemical degradation. The medium should not interfere with the analysis and must allow the sample to be held for a reasonable period of time. A preservation medium that also extracts VOCs from soil is preferable.
- Preparation: sample should be prepared for analysis without loss of volatiles.
- Analysis: analysis that utilizes automated equipment without repeated opening of the sample container is preferable.

Beliveau said the objective is to develop an on-site analysis procedure for estimating total VOC concentrations relative to the site-specific working standard of 0.2 mg/kg (200 ppb). He explained that screening is the key step in soil analysis, where the most important decision is to determine which analysis method to use and whether the proper amount of sample has been obtained.

The procedural methods for sample screening, collection, handling and analysis that result in minimal VOC losses are:

Sample Screening and Collection

Samples should be removed quickly from the opened soil using a coring device that collects a measured amount of soil without forcing air into the sample and accurately dispenses it into a screening container or final sampling container. The collected sample is screened using a calibrated Photo Ionization Detector (PID) to determine the general level of contamination. If the sample is above 0.2 mg/kg, the soil is placed in a measured amount of methanol. If the sample is below 0.2 mg/kg, the soil is placed in water containing a small amount of sodium chloride and preserved with sodium bisulfate, or is placed in a closed container system with no head space, like the Encore Sampler System Capsule.

Sample Handling

The amount of soil must be known, regardless of medium used. The container must be of known weight, and the amount of medium must also be known in weight or in volume. There should be provisions for determining the percent solids of the sample in the field or in the laboratory. (Dry weight results are required). In Region 1, if the sample is between 10 and 30% solids, an estimate is required, but data must be rejected for samples with <10% solids. The amount of sample analyzed in dry weight must be known to calculate the results.

Sufficient accuracy in the above measurements is required if the sample weight is to be known and the extraction fluid is to be in the same ratio for all samples and standards. All operations should be performed to diminish volatile losses and ensure that data is valid and reproducible. It is not necessary to bring extra equipment into the field, since known weights can be determined in the lab prior to collection.

Sample Analysis

Methanol-preserved samples, if prepared in the proper soil to liquid ratio, can be analyzed using methanol dilution Purge and Trap Techniques, the method of choice. Calibrations are performed in the same manner as analyzing water VOA samples. Methanol has been used as part of SW 846-Method 8240 and CLP SOWs to determine concentrations of medium to high level VOAs. This technique is commonly known as the methanol dilution technique utilizing Purge and Trap GC/MS or Purge and Trap GC/PID/ECLD. Improved detection limits can be realized when the instrument is set up for SIM (Selected Ion Monitoring) analysis. A limited set of analytes must be chosen.

Water/bisulfate-preserved samples can be analyzed in two ways: 1) Equilibrium headspace analysis of the soil/water mixture using GC as the technique of choice, or 2) Purge and trap performed directly from the VOA vial using Dynatech/Varian system or the Tekmar single needle purger system. Other systems are available using special caps that are placed on the vials in the field.

In-vial headspace analysis/GC is essentially the screening method and must be performed immediately using a headspace GC analysis. The sample is added to water, and analytes of interest go into the headspace equilibrium, lowering recovery and yielding significantly different data than methanol.

Encapsulated samples utilizing the Encore Sampler System. The sample is encapsulated in the field for off-site analysis. The laboratory must know the approximate concentration of the sample. If medium-to-high concentration, the sample is extruded into a vial containing methanol. (Soil will be exposed to air twice but losses can be minimized). If low concentration, the sample is extruded directly into a heated purge and trap device containing water. This is the most commonly used method of analysis.

Beliveau mentioned that there are procedures for soil VOA preservation under development by both EPA and ASTM/EPA. The ASTM/EPA subcommittee is developing a Standard Operating Procedure for Preservation, Handling, and Analysis of Medium Level VOA samples. In addition, EPA has drafted two new in-vial collection and analysis methods, 5035 and 5021, for samples with low-level VOC concentrations. The Region I draft methods will include a VOA screening procedure; a procedure for sample collection, weighing, reweighing and percent solids determinations; and a decision tree that leads the user through the process. Preservation will be performed preferably in the field.

Sample weighing and reweighing, dispensing of a measured amount of methanol, and percent solids determinations are best performed in a fixed laboratory, although they can be performed in the field. Laboratories will prepare the vials, weigh the vials, and dispense the methanol or water bisulfate prior to sending the vials into the field. When the sample is returned, the laboratory will reweigh the vials, analyze the sample and determine the percent solids of the soil samples.

Beliveau listed the advantages and limitations of methanol preservation, water/bisulfate preservation, and encapsulation systems like Encore. He noted that the use of plain water as a sample medium has been fairly common, but water alone is not a very good preservative.

Advantages of methanol as a preservative:

- Eliminates volatile losses when performed immediately; solubilizes all VOCs so none volatilize into headspace
- Eliminates biological degradation during storage
- Extracts the volatiles from the soil better than other solvents or water
- More than one analysis can be run using one sample.

Disadvantages of methanol:

- Is a hazardous substance, and shipping restrictions apply (although this can be avoided if the total amounts shipped at any one time are small enough)
- Is a toxic and flammable substance
- Allows only for medium to high concentration sample analysis. Sample concentrations under 0.2mg/kg cannot be detected by common methods of analysis. Selected Ion Monitoring (SIM)/SC/MS is used to enhance the detection limits of a limited number of analytes. Methanol *can* be used for lower level detections under special analytical conditions.

Advantages of a water/bisulfate as a preservative:

- Eliminates volatile losses if used immediately
- Allows for low-level detection limits
- Eliminates biological degradation and allows for extended storage and holding times.

Disadvantages of water/bisulfate:

- Must be used with specialized equipment either in equilibrium head space mode or with direct purge and trap mode. Both modes are utilized through the VOA vial septum or in-vial system techniques, but equilibrium headspace uses a different calibration technique.
- Is impossible to remove all water from the sample prior to analysis; however, purgability is not necessarily a significant issue if instruments are calibrated properly
- Does not extract organics from the soil totally or as well as methanol or other organic solvents. Removes only those VOCs that can be leached from the soil.

Advantages of the Encore encapsulation system:

- Encapsulates the sample immediately without introducing air into the sample
- Allows the sample to be shipped with minimized loss of volatiles
- Can be used for either methanol dilution method or direct-heated purge and trap method using water (the conventional soil prep/analysis method)
- Can be reused many times

Disadvantages of the Encore System:

- Does not preserve the sample immediately and must be opened in the lab for sample extrusion
- Percent solids must be determined from a second sample sent to the laboratory
- Specialized equipment for sampling and shipment must be used. The laboratory must have compatible equipment for sample preparation.
- Stainless steel equipment is expensive

Beliveau provided a list of questions to be answered prior to sampling and analysis to help guide a project manager in choosing the best method for a particular project:

- What are the concentration levels that will be encountered on site?
- What is the level of detection required by the project?
- Can the samplers screen the samples properly to determine the level of concentration and thus choose the proper preservation technique?
- What analyses are customarily performed at the contract laboratory? Can the laboratory perform methanol dilution analysis, equilibrium head space analysis, or in vial purge and trap analyses?
- Who will do what? Will it be the laboratory or the field samplers who prepare the VOA vials, weigh the vials, add measured quantities of methanol or water/bisulfate, prepare the samples, and reweigh the vials upon return from the field? If field samplers do the work, they must be trained and have experience to perform the work in an efficient manner.
- How will data generated by this procedure compare to previously analyzed samples? How will this data be used and interpreted?

Question and Answer Session

Kay Wischkaemper, Region 4, asked about comparing older samples to those analyzed with the new methods. Beliveau stated that, because the new methods would yield higher concentrations, this type of comparison would not provide a direct comparison of VOC reduction in soils between the two sampling times. Wischkaemper also expressed concern about consistency across the country. Dick Willey, Region 1, responded that it would be necessary to actively promote the use of these new methods by all regions.

Mary Beck, Region 3, raised the issue of soil particle size, pointing out that a syringe will not work with very fine soils. No absolute numbers were provided.

Doug Yeskis, Region 5, inquired about the cost of the new methods. Beliveau estimated that each sample would cost about \$220.00. Willey mentioned that he thought EPA was moving toward having each Region bear its own costs of sampling and analysis, so this could have an impact on decisions about which methods to adopt.

PROPOSED OUTLINE FOR “MONITORING OF FIELD PARAMETERS DURING GROUND-WATER SAMPLING PROGRAMS,” DOUG YESKIS, REGION 5

Doug Yeskis, Region 5, distributed a proposed outline for the “Monitoring of Field Parameters During Ground-Water Sampling Programs” and presented the following questions that he would like to be answered by the Forum:

- Should the Forum move forward to develop the paper despite the fact that ASTM recently has developed standards for ground-water sampling and a recent Presidential Order for dictating the use of industry standards for federal programs has been issued?
- Can the Forum reach a decision to accept or reject the criteria needed to finalize the paper?

Yeskis said that he would like to develop a checklist of issues that have been addressed in previous reviews of the paper in order to ensure that these issues will not be revisited during future reviews. In addition, he would like the Forum to approve the paper with a 2/3 Forum majority vote, with two votes being given to each Region.

Yeskis then noted that there will be nine parts to the paper:

- 1) Introduction, which will be basically the same as a previous version of the document. However, a decision was made to treat the document more as a “decision-tree” than a “how-to” paper.
- 2) Data Quality Objectives.
- 3) Information needed prior to sampling.
- 4) A description of different sampling methods, which will include traditional, discrete, and other sampling methods, as well as low-stress and minimal draw-down.
- 5) A decision-process for determining applicable sampling methodology.
- 6) Field filtration.
- 7) Sampler decontamination.
- 8) Post-sampling activities.
- 9) Conclusion, which will include a discussion that this is a living document, and additional SOPs for other sampling procedures.

Kathy Davies said that she thought the document would include only sample SOPs. Yeskis agreed, noting that these SOPs would follow the Table of Contents proposed below:

- 1) Introduction
- 2) Scope and Application
- 3) Equipment
- 4) Purging/Sampling Procedures
- 5) Field Quality Control
- 6) Decontamination Procedures
- 7) References

Yeskis noted that the document will include the following attachments:

- 1) Pre-sampling checklist examples
- 2) Ground-water log examples
- 3) Traditional specific SOP sampling, *i.e.*, bailer
- 4) Low-stress/minimal drawdown SOP
- 5) Discrete *in situ* samplers SOP

Yeskis said that he would prefer to get Forum approval on the proposed Table of Contents and SOPs through a vote through e-mail as soon as possible.

NATURAL ATTENUATION, FELICIA BARNETT, STLP–REGION 4

Felicia Barnett, STLP for Region 4, noted that the Superfund Technical Liaison Program is trying to keep up with the work EPA is doing on Natural Attenuation, and feels that analytical procedures for

Natural Attenuation are currently not being addressed by EPA. Because of this, she would like for ORD, the ESD Laboratories, and Regional personnel, particularly hydrogeologists, to get together to discuss this issue. Barnett noted that Jon Josephs, STLP for Region 2, is heading up this effort. Dick Willey and Howard Orlean volunteered to be Regional contacts. Willey noted that analytical chemists should be included in this effort as well.

GWRTAC AND TIO PARTNERSHIPS, RICH STEIMLE, TIO

Rich Steimle, TIO, discussed the Ground-Water Remediation Technologies Analysis Center (GWRTAC). GWRTAC was established through a cooperative agreement between the National Environmental Technology Applications Center (NETAC) of the Center for Hazardous Materials Research (CHMR) and the EPA. The role of GWRTAC is to collect, compile, assimilate, and provide current information concerning innovative ground-water remediation technologies to the ground-water community.

Since GWRTAC specifically addresses ground-water issues, Steimle asked all Ground Water Forum members to evaluate the GWRTAC website in detail, and give him feedback on the site's contents and structure. Kathy Davies noted that the site has a comments section on it where visitors can reply to GWRTAC directly and cc: Steimle in their message. The Forum agreed to visit the site and give feedback to Steimle by the end of March.

Steimle then noted that TIO is playing a partnering role in getting new technologies used at sites. He added that TIO has been actively involved in EPA's Remediation Technologies Development Forum (RTDF), which was established in 1992 by EPA after industry representatives met with the Administrator to identify ways of working together to solve complex hazardous waste remediation problems. The RTDF is a consortium of partners from industry, several government agencies, and academia who share the common goal of developing more effective, less costly hazardous waste characterization and treatment technologies.

FUTURE DIRECTIONS OF THE GROUND WATER FORUM, RICH STEIMLE, TIO

Rich Steimle asked the Ground Water Forum if it would be willing to develop a list of state technical contacts who could act as liaisons between the Forum and the states. This list should include names, titles, e-mail addresses, and phone numbers. He explained that such a list could help the Forum prove to Headquarters that it is looking to the future, since it appears that Superfund Reauthorization will most likely result in the states having more responsibility for cleanups.

Doug Yeskis noted that it may be difficult to identify these contacts since there is a high turnover rate in the states. He added that a TSP Home Page could help to get the states more involved.

APPLICATION OF DOWNHOLE EM TECHNIQUES, BILL BRANDON, REGION 1

Bill Brandon, Region 1, discussed Region 1's success with downhole EM techniques at a site where the USGS used downhole EM to better characterize the plume. He said that the technique is fairly inexpensive and has worked well for the Region. The Region hopes to use it in the future at a number of sites along the ocean to locate the saltwater interface in order to better control the migration of contaminants to the ocean.

OPEN DISCUSSION ON TECHNICAL SITE-RELATED ISSUES

Kathy Davies said that Joe Williams from the R.S. Kerr Laboratory in Ada, OK, is trying to find information on the biological aspect of MOC3D for a USGS contact. Anyone with information on this issue can contact Davies at 215-566-3315.

ACTION ITEMS AND FUTURE ISSUES RESULTING FROM THIS MEETING DEVELOPED BY RUTH IZRAELI, GROUND WATER FORUM CO-CHAIR, REGION 2

Action Items

1. Next Meeting Venue

The Forum agreed to have its next meeting concurrent with the Geological Society of America Annual Meeting in Salt Lake City, Utah, in October 1997. An alternative choice was the Robert S. Kerr Laboratory in Ada, OK. The Forum created a Meeting Subcommittee comprised of Herb Levine, Ruth Izraeli, Bill Brandon and Howard Orlean to discuss plans for the next meeting.

2. State Hydrogeological Contacts

Each Region will be responsible for developing a list of hydrogeologists in their respective states. These lists are due to Rich Steimle and/or Co-Chairs by March 31.

3. Feedback on GWRTAC

Members agreed to visit the GWRTAC website (<http://www.gwrtac.org>) and give Rich Steimle feedback on the quality and utility of the site. Discussion of the site will be on the Conference call agenda for April.

4. GW Forum Homepage

Curt Black will send the Forum a message on where the preliminary Ground Water Forum website may be found by March 15. Get comments back to Black or Edie Findeis of EMS. Findeis will maintain the webpage and coordinate (at least initially) with Black.

5. Natural Attenuation (NA)

Ruth Izraeli will pull together Forum comments on the OSWER NA directive and submit them to the workgroup in HQ (Completed on 2/21/97). Curt Black will coordinate review of the draft AFCEE NA protocol and Black and Izraeli will coordinate reviews of the upcoming EPA NA guidance Jerry Jones discussed during the meeting (ongoing).

6. Roundtable Discussion on Permeable Reaction Walls

Herb Levine, Ruth Izraeli, and the other TSP Forum co-chairs will review EMS's annotated notes and send them to the Regions in March. Other follow-up activities are to be determined by the Forums.

7. Other Issue papers and Projects.

Dick Willey and Rene Fuentes will continue heading up the SW/GW interaction project. Bernie Zavala and Doug Yeskis will submit a draft outline of the Ground-Water Sampling paper to forum members by March 7. Zavala and Black volunteered to work with Jon Josephs and Felicia Barnett on the STLP Natural Attenuation Project.

Future Directions/Issues

How to plan for and facilitate a larger state role in Superfund?

Coordination with the Ground-Water Protection Forum on issues of joint concern—for example, sampling for 1,4 dioxane and ethyl dibromide (EDB) in ground water or surface water/ground-water interaction issues .

Institutional checks and balances on protection of ground-water resources and prevention of the use of contaminated aquifers during active or passive remediation. Roles and responsibilities of local municipalities, health departments, the states and EPA.

ENGINEERING FORUM BUSINESS SESSION**FORUM GOALS AND FUTURE ISSUE PAPERS, BOB STAMNES, REGION 10**

Bob Stamnes, Region 10, led a discussion on Forum goals achieved so far, future goals and actions necessary to achieve them, and a review of ongoing Forum projects and issue papers. Stamnes then noted that two issue papers have been completed: one on Soil Vapor Extraction (SVE) and one on Thermal Desorption (TD). No other issue papers are currently in production. Frank Vavra, Region 3, urged the Forum to continue producing issue papers and suggested that small roundtables be set up for topics that could be addressed in future issue papers. He added that, to avoid future legal challenges to publication, papers should be written without identifying specific RPMs and naming specific sites.

One member noted that permeable and non-permeable walls were suggested as a topic for a new issue paper during the last TSP meeting. A workgroup was assembled to address these issues. Steve Kinser, Region 7, suggested that both papers be produced simultaneously through the same process used for the SVE and TD papers. Stamnes suggested that the Forum collaborate with the Ground Water Forum on these papers. Pam Scully, Region 4, mentioned that there is a lot of interest in the use of reactive walls for treatment rather than merely for containment. Stamnes requested any member not already on a workgroup to join one.

One participant mentioned two issue papers that were proposed for development during the last meeting: Enhancement of Tech Transfer Support and the Forum Mission Statement. Vavra said he would have the mission statement available for distribution to other Forum members soon.

The group then came up with a list of characteristics that make the Engineering Forum unique:

- Its members include engineers and others from various scientific disciplines
- Its membership consists of volunteers
- It provides a continuous communication point of contact between the Regions and the EPA laboratories
- It resolves technical problems during monthly teleconferences
- It supports Headquarters and the EPA laboratories by reviewing guidance documents for technical accuracy and consistency
- It promotes technical assistance through networking, development of issue papers, semiannual national meetings, monthly teleconferences, meetings with other organizations, etc.
- The function of the Engineering Forum was identified by RPMs as a regional need
- At a time of shrinking budgets, the Engineering Forum provides an inexpensive way to acquire technical information.

- It identifies training needs

Stamnes asked participants what the Engineering Forum should be working on. The following were discussed:

- How can the Forum improve the process of ranking topics for the development of issue papers. The reaction of RPMs to the previously-used issue ranking process was discussed with mixed reactions.
- The distribution of issue papers should be improved. The Engineering Forum is in the process of making documents more readily available electronically. This will allow for the distribution of technical information directly to RPMs. Hard copies of technical documents will also be provided to each Engineering Forum member for access by staff without electronic access.

Stamnes pointed out that papers are now being posted on the Web, and that a list of such papers should be compiled. He urged all participants to communicate with other Forum members if they need copies of papers, reminding everyone that networking is very helpful in information sharing.

Gwen Hooten, Region 8, shifted the discussion to polling RPMs about topics they would like to see addressed by the Forum. She said that the last poll was taken two years ago and that a new poll should be conducted. Stamnes suggested sending out a notice on what the Forum is currently working on and asking RPMs for new ideas. Mary Beck, Region 3, added that it should be made clear in the notice that the Forum will pick only a few issues to work on at any one time due to limited funding. Janowski suggested that RPMs be polled for issues on a monthly basis and the issues be identified early on the agenda for the monthly conference calls. He said this would foster discussion of multi-regional issues. Stamnes agreed that this would make the calls more productive, adding that ORD and HQ should know what the issues are ahead of time so they can have more input.

Hooten asked whether reuse of smelter slag contaminated with arsenic and lead, especially the technical aspects of slag reuse practicality, could be considered as a topic for a new issue paper. She mentioned that the state of Utah has begun considering use of this slag for highway construction, but conceded that liability is an issue because the slag exceeds generic exclusion levels and there is no track record of beneficial use. Hooten also mentioned that in Regions 6 and 7, work had been conducted on beneficial reuse of piles contaminated with lead. She called for a coordinated effort on these types of reuse issues, and expressed concern about one region possibly vetoing something another is working on. JoAnn Cola, Region 9, added that RCRA representatives have said that soil from Superfund sites can never be reused unless the site de-listed.

Stamnes encouraged Hooten to begin working on the paper, suggesting that she organize a work group on it that could serve as an example of what can be done in terms of coordination of efforts. Stamnes urged all Forum members to be proactive as well as reactive about writing papers, citing potential personal benefits of recognized authorship as well as the broader benefits of increased learning. Rich Ho, Region 2, questioned the feasibility of this in light of limited monetary resources. Stamnes countered that there are many options available for support, which could be discussed after the meeting.

LIST OF TECHNICAL EXPERTS, STEVE KINSER, REGION 7

Steve Kinser, Region 7, described the progress on assembling this list. This was followed by a discussion of who should listed, i.e. forum members only and/or other regional people as well. There was also a discussion of the type of expertise that should be listed. Participants agreed with Stamnes' opinion that it would be best to start out listing just the Forum members. Janowski noted that the

Forum could send out an e-mail announcement to all RPMs in the Regions to encourage them to contact their regional Engineering Forum representative with requests for assistance. This would allow RPMs to get a more immediate response. Trish Erickson, ORD/NRMRL-Cincinnati, suggested sending this announcement in a table format with four fields: 1) discipline; 2) site type; 3) contaminants; and 4) technologies. Steve Kinser will write his experiences down and send it to the forum members as an example of what should be done. Forum members will then send their own write-up to Steve Kinser. Steve will assemble the information for distribution to forum members. This document will include a table, similar to that suggested by Trish, if the information can be assembled in that format.

OVERVIEW OF THE TECHNICAL SUPPORT PROGRAM STATUS, RICH STEIMLE, TIO

Rich Steimle, TIO, presented an overview of TSP that stressed the interdependence of the Forums, Headquarters, and ORD. He said the Forums deal with field problems, HQ provides funding and guidance, and ORD provides technical expertise and laboratory facilities. He described each group as being a client to the others, thus good communication among the three is essential. Steimle admitted that money is a problem and that HQ has been discussing cost-sharing for guidance and issue papers. He also stated that OERR considers Technical Support a high priority. He advised the Regions to think carefully about distribution of funds, reminding the audience that there is a limit of \$50,000 per site.

Steimle then mentioned the SVE and TD issue papers, saying John Blanchard had decided to postpone publication of the SVE paper until OERR approval. Stamnes noted that the Forum already had copies of the paper and asked if they should hold off on distribution. Steimle said he had considered the paper final and thought Blanchard had waited too long to intervene. Ken Skahn, OERR, blamed the hold-up on negative comments by the Office of Underground Storage Tanks (OUST). Ken Brown (CRD-Las Vegas) mentioned that a background issue paper was final but not yet distributed, and had also been submitted to the *Journal of Environmental Monitoring & Assessment*. Scully said she did not think that Region 4 had a copy of this paper, Vavra clarified that copies had been sent to forum members in each region. Stamnes said the Forum needed to close the gap on this and re-distribute the paper if necessary.

Steimle predicted an increase in state involvement with TSP, but said that HQ is not communicating well with states and doesn't know who the experts are in most cases. He tasked Forum members to begin providing information about TSP to the states, emphasizing that this will make a good impression on HQ and help assure continued support for the program. Steimle suggested that the Forum meet to decide the best way to transfer information to the appropriate state representatives. He favored communicating with technical staff as opposed to management, but cautioned that organization varies from state to state.

OERR "SPOKES" UPDATE: DISCUSSION OF HOW OERR CAN ASSIST THE FORUMS IN MEETING THEIR GOALS, KEN SKAHN, OSWER

Ken Skahn, RD/RA expert in the Region 3-8 Center, OERR, informed the Forum that there are 14 Technical Support Centers, five of which are regional. The program areas that they support include: state site evaluation; the oil program; community involvement; environmental responsibility; and information management. Skahn said that there are reauthorization, risk, and ground-water experts in the Center as well. Stamnes requested that Skahn provide a list of these experts to other Forum members. Skahn agreed.

Skahn proceeded with a discussion of projects and issues that could benefit from OERR assistance. The first issue was cost-estimate assistance to RPMs. Statements of work and designs for RD/RA cost estimates are becoming increasingly complex, while RPMs often lack experience in cost estimation. Contingency assessment on costs would provide a cost range that would help to overcome the problem

of discrepancies between the ROD cost estimates and subsequent estimates. A second issue was Operations and Management (O&M) fact sheets and reports that outline OERR's role in overseeing RPMs. Guidance for 5-year reviews is being revised and the update will be available within one year. A participant asked whether any problems had been averted by the 5-year reviews or O&M reports, suggesting that the benefits of these reports be documented. Skahn encouraged Forum members to get involved in reviewing and perhaps producing these papers. He then mentioned a revision of landfill cap performance monitoring requirements that he is working on currently. He said ORD and the Corps of Engineers want to provide input to this guidance. Susan Sladek, OERR would like Forum assistance in gathering information on 5 year reviews. In response to a request from Janowski, Skahn agreed to ask Susan Sladek in the Region 3-8 center, OERR to write up a brief statement on the information she needs from forum and distribute this statement to all Engineering Forum members.

Neil Thompson, Region 10, asked if any other Forum members had experienced problems with states assuming responsibility for O&M subsequent to the initial one-year period for which EPA provides funding. Most participants responded affirmatively, citing lack of institutional control as a primary reason. Also, the states would like EPA to provide more capital upfront to reduce state costs later. A participant commented that institutional control is a property-rights-takings issue for fund-lead sites, but Vavra pointed out that most sites are enforcement-lead rather than fund-lead. All agreed that the problem would worsen as processes are sped up to meet President Clinton's goal of 900 site construction completions by the year 2,000. Skahn suggested that life-cycle analysis could help, citing the utility of the RACER model. Many Regions don't have cost estimators, and Janowski urged reliance on Corps of Engineers expertise rather than site-specific estimators. He also said that District Offices are more accessible than Regional offices, and that if they are use to estimating cost for Federal Facilities, they should be familiar with RCRA vs. CERCLA terminology.

STATUS OF THE EPA LAB PROGRAMS, TRISH ERICKSON, ORD/CINCINNATI AND KEN BROWN, CRD, LAS VEGAS

Trish Erickson, ORD/NRMRL-Cincinnati, gave a brief overview of the Superfund/RCRA Technology Support Centers (TSCs). The objectives of the TSCs are to provide technical support and assistance to Regional staff; improve communications among Regions and ORD labs; ensure coordination and consistency of remedial technologies; and furnish technology workshops and state-of-the-art science information for site managers at Superfund and RCRA facilities. Experts are based at the National Risk Management Research Laboratory (NRMRL) and the Andrew W. Briedenbach Environmental Research Center (AWBERC) in Cincinnati, OH; the Robert S. Kerr Environmental Research Laboratory (RSKERL) in Ada, OK; and at associated universities and research institutions. The TSCs activities are augmented by several technology-oriented firms and their support contractors and consultants. Erickson assured the group that only the Treatability Study Assistance Program was in danger of being cut for lack of funding. ORD has committed to maintaining staff support at 60.5 FTEs, 23 of whom are in the Risk Management Laboratory. How ORD and OSIER will share funding has yet to be decided. Erickson mentioned that the Alternative Treatment Technology Information Center (ATTIC) and the Superfund Innovative Technology Evaluation (SITE) Program are both available on the ORD Web page at:

<http://www.epa.gov/ORD>

Ken Brown (CRD/Las Vegas) said that the EPA's Las Vegas laboratory is being reorganized and increased from two to five branches. Brown is the only TSC FTE in this lab, but approximately 50 NPL sites are being worked on at any given time. The lab has also become involved with Brownfields in Region 6 and has received a tentative request for assistance from Region 8. Brown mentioned a recently released an issue paper titled *Field Sampling and Selecting On-Site Analytical Methods for*

Explosives (EPA-540-R97-501). He said that one of the RPMs co-authored the paper, which hopefully will set a precedent for the future. Brown encouraged Forum members to write and publish papers they think would be useful, partly for the recognition they would likely receive within the Agency. He assured the Forum that all ORD papers are peer-reviewed. Stamnes asked if a paper on Natural Attenuation had been done or was planned. Brown suggested he talk to Jerry Jones (RSKERL-Ada) about this.

REVIEW OF ACTION ITEMS AND ASSIGNMENTS FOR THEIR COMPLETION, FRANK VAVRA, REGION 3

Vavra led the group in summarizing the following action items identified at this meeting:

- Finalize Mission Statement (Frank Vavra)
- Identify state contacts for technology transfer and present to Rich Steimle (All Forum Members)
- Develop list of contacts in all Federal Agencies including DOE (Bob Stamnes, Region 10 with Federal Facilities Forum)
- Send out completed issue papers (Rich Steimle, OERR). Identify published papers, those that are in the works, and review old list of issue papers to see if some topics need to be addressed again (Rich Ho, Region 2).
- Incineration: Hold a national meeting soon and produce an information summary to present at the next Engineering Forum meeting (Chet Janowski (Region 1) and Frank Vavra (Region 3), with the assistance of Ken Skahn, OERR).
- Identify the next Roundtable topic (Chet Janowski, Region 1 and Rich Ho, Region 2)
- Identify technical issues for conference calls and communicate these to forum members and regional personnel early so that they can plan to participate (All Forum Members).
- Send lists of Forum members' expertise to Steve Kinser, Region 7. Do not include other regional resources at this time (All Forum Members).
- Distribute his matrix of OERR responsibilities to all Forum members (Ken Skahn, OERR)
- Inform Ken Skahn of highlights of Forum's activities so that he can include them in his bi-weekly activity report to management (All Engineering Forum Members).
- Send Roundtable paper to Forum members by 2/21 for comment (Co-Chairs).
- Supply assistance on revision of Landfill Cap Guidance regarding evaluation new materials, as requested by Ken Skahn (Mary Beck, Region 3).
- Provide information to Susan Sladek on 5 year reviews after Forum members receive Sladek's summary of needs. (All Forum Members).

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